

The Effect of Reflective Pedagogic Paradigm Approach toward Achievement on Chemical Equilibrium

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Abstract This study aimed to determine the effect of the application of reflective pedagogical paradigm approach (RPP) and contextual approach in learning when viewed from student achievement on chemical equilibrium material. This research was a quasi-experiment using posttest control group design only. The subjects of the study were 45 high school students from one of the private high schools in Yogyakarta. The sample was determined by cluster random sampling, one class as the experimental class using RPP approach to 22 students and one class as control class using contextual approach to 23 students. Methods of data collection were tests to measure the student achievement and reflection note to determine the quality of approach. Data analysis used quantitative descriptive and Anova. The result showed that there is a difference of application of paradigm of reflective pedagogy approach and contextual approach in learning in terms of student achievement with learning significance value of learning achievement smaller than alpha. Learning by using the RPP approach through student reflection gives a happy response, no difficulty in understanding the subject matter and the value that can be taken in the form of cooperation and thoroughness in action. students who study harder and supported from improving student learning outcomes, so that RPP approach can be applied in chemistry learning.

Keywords: *reflective pedagogical paradigm approach, contextual approach, learning achievement, chemical equilibrium, reflection*

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1. Introduction

Education has an important role for a human to develop the potential for the future. Education is essentially a conscious effort to do all kind of a quality action and activity [1]. The most important part in achieving the quality education (especially in formal education) is learning. Learning can be stated as quality when it has achieved the defined outcome. There are various types of learning outcomes depending on the model or theory of learning [2]. Learning must be set aiming at the students able to face the challenges and obstacles in life through their competencies [3]. Learning is a deliberate, targeted and planned effort, with a defined goal before the process is carried out, and controls the implementation [4].

Chemical learning is inseparable from the scientific approach to learning. Chemistry is an integral part of science learning to develop the competencies in order the students can explore, understand, and master the concept of chemistry. And then they can solve the problems of everyday life. The chemistry learning process requires an

appropriate strategy or approach to the character of the material, and not only deliver with lecture method but also through the learning approach connecting the student's experience, in order the learning achieve the goal of meaningful learning.

According to constructivist theory, learning is not only memorizing but rather to the process of building the knowledge through experience. Achievement is the result or outcome achieved by a person or group from activities. Learning achievement is a change in the psychology scope as a result of the experience and learning process achieved by students in a certain time [5].

The selection of learning approach must consider a fun and meaningful process in everyday life. The purpose, the students can connect their knowledge and everyday life, and then they can find a meaning in learning that is useful for their lives in the future. The learning, aiming at providing meaning and value on the subject matter, can use a reflective pedagogical paradigm (PPR) approach. Paradigm reflective pedagogy approach (PPR) is an educator way to help and build the students into a full and balanced human person [6]. A reflective pedagogy paradigm is a learning approach emphasizing not only transfer the

knowledge from teacher to student but also is a process of interaction between teachers and students [7]. This PPR approach emphasizes the importance of the reflective learning process implementing into concrete actions and invites the students to see the deeper from the meaning of learning through understanding that realized in actions in daily life.

The reflective pedagogical paradigm approach is a learning procedure containing students' interaction with the material and teacher as a facilitator by applying a reflection in each process in order to obtain meaning based on a hierarchy of values, norms, and conscience. The obtained outcomes of learning using PPR approach are not only the knowledge mastered by students, but rather to develop the ability to think and act (competence), conscience, and sense of compassion to others (compassion). With PPR approach can also increase the learning motivation by involving the students as critical agents into the learning process, so that this makes the learning process more personal because it brings the experience of teachers to the students. According to reflective learning means to understand more deeply what is experienced, especially to seek what is the meaning of teaching materials in order to solve the problems [8,9,10]. So, learning with a reflective approach is an approach of developmental facilitation patterns for students both intellectually and emotionally to help develop a full and balanced human person [11,12,13]. The learning cycles of PPR, there are five steps: context, experience, reflection, action, and evaluation [8]. Education considered successful when students find knowledge, understanding, skills, and values, and the teacher role is a facilitator [14].

Students urgently need to understand the concepts in line with the workplace and the dynamics of PPR implementation including five steps, starting from context, experience, reflection, action, evaluation [8,9] make a starting point for continuing the next learning process. This PPR learning emphasizes the importance of the reflection of the learning process into real action. The PPR invites the students to see the deeper from the meaning of learning through understanding that realized in actions in daily life. Through this learning activity, the obtained outcomes of learning using PPR approach are not only the knowledge mastered by students, but rather to develop the ability to think and act (competence), conscience, and sense of compassion to others (compassion). Education considered successful when students find knowledge, understanding, skills, and values, and the teacher role is a facilitator [6,14].

Based on the background, the objectives of this study were: to determine the effect of PPR approach to learning on learning achievement and determine the quality of learning using PPR approach in grade XI of High School students of SMA De Britto on chemical equilibrium material.

2. Method

The research method used quasi-experiment with posttest only group design. The population was all students of grade XI IPA SMA / MA (Science of Senior High 2School/Islamic High School) which have the equal level

to SMA De Britto Yogyakarta. Random sampling was used in sampling technique and obtained XI IPA 4 and XI IPA. There were 22 students of class XI IPA 4 as the experimental class and treated by reflective pedagogical paradigm. And, there were 23 students of XI IPA 5 as the control class and treated by contextual learning approach.

The hypothesis in this researched; there influence of applying RPP approach to learning achievement on chemical equilibrium material. Anova used to test the Hypothesis with a prerequisite test of normality test and homogeneity test.

The independent variable in this research was the RPP approach, and the dependent variable was the students' achievement. Data collection techniques used documentation techniques and tests. Documentation techniques in the form of daily chemical test scores are used to determine the equilibrium of students' abilities. The test technique is a multiple choice question that is used to measure the students' achievement.

The validity and reliability of the instruments initially tested. The test instrument of this research was in the form of multiple choice consisting of 30 items. Before being used to obtain research data, the instrument tested with a validity test and reliability test. The validity test conducted with 169 students in one of the high schools in Yogyakarta who have received chemistry equilibrium subjects. The results of the test; all the questions declared valid in the analysis using the Quest program. Reliable with respect to the level of determination of measurement results. A test is said to have a high degree of reliability if the test gives a fixed result despite repeated tests [15].

3. Result and Discussion

Prior to the study, the first was a knowledge test between the experimental group and the control group to determine the initial ability between the experimental group and the control group in an equal position. Before the chemical equilibrium test performed; normality and homogeneity tests should perform as a prerequisite for the equilibrium test. Using Kolmogorov-Smirnov with a 5% significance level for the normality test, the result was an experimental group of 0.067 and a control group of 0.167. Because of the level of significance of more than 5%, means that the samples distribution were normal.

Homogeneity test conducted on the population of the student among the learning. Using Levene Statistic with 5% significance level, the result was 0.667. Because it was higher than the 5% level of significance, it accepted. Based on these results, it concluded that the student population among the learning is homogeneous.

After the population was normal and homogeneous distribution, then proceed to the hypothesis test with ANOVA with a significance level of 5%. Analysis of learning achievement obtained from the primary data that is the value of daily repetition of the material rate of the reaction prepared previously. After the learning process in the experimental class using the RPP approach and the control class using a contextual approach, the results are presented in [Table 1](#).

Table 1. Chemistry Achievement Data

Criteria	Classes	
	Experiment	Control
Mean	87,91	82,57
Standard Deviation	7,37	7,64
The number of students	22	23

Table 1 shows the average result in the experimental class of 87.91, while the control class is 82.57. This is in accordance with the results using the Anova test that is 0.022 of significance level lower than 5%, and then H₀ is rejected. It means; there is an effect of applying the approach in chemistry achievement between students treated using RPP approach and contextual approach. Based on the marginal mean, RPP learning approach provides better learning achievement than using a contextual approach.

Learning achievement in the cognitive aspect concerns students' understanding of chemical equilibrium, especially factors affecting chemical equilibrium. The average experiment class students have a higher understanding than the control class because in the experimental class there are activities that emphasize the process of reflection.

Increased understanding also is done by providing experience to students. The experimental class has experience in the form of direct experience that is doing experimental design and practice in the laboratory according to the design that has been designed. The treatment in the experimental class aimed to enable students to construct their own knowledge. The treatment trained the students to learn independently and confidently. Reflection activities in the form of analyzing experiments have been done individually by the students. Students are invited to re-understand the knowledge that has been obtained. As the impact, this step can improve the students' understanding. Reflection is useful to help students to improve understanding of learning [11].

Discussion can make students to absorb ideas, ideas, and mutual opinions. Students not only get knowledge from teachers but also from other students. Discussions in the experimental class are often conducted among students so that it is more effective than among students and teachers [12].

According to Haniek [16] in his research that the RPP approach can improve students' ability from the aspect of competence, conscience, and affection. Considering that RPP contains these three interrelated aspects to develop a person intact. In line with that Albertus, Punaji & Dedi [17] and Prasetyo, Santoso & Marjono [13] also said that the implementation of RPP has a good effect on student achievement. Based on the previous description, learning RPP approach can improve students' ability on the cognitive aspect by understanding the concept of chemical equilibrium concept that has been taught.

Reflection is the most important part of the RPP stage. Stages of reflection are done by writing a reflection notes by each student. Through reflection note, teachers can understand the state of each student in the learning process. The learning process conducted in 5 meetings. Note of reflection consists of several questions that are about the student's feelings, constraints faced, the value of humanity that arises during the learning process, and the action to do next. The result of analysis of student reflection note in experimental class during chemistry learning obtained 70.9% student feel happy, and 59.99% student has no

difficulties in comprehending the subject matter. Meanwhile, the value of humanity that emerges is cooperation and in the form of learning achievement.

Khodijah [11] states that reflective learning approach is an alternative for teachers to use and help the students to improve understanding and awareness of Islamic values learned through learning activities involving the process of reflection. The results of research conducted by Loo and Thorpe [18] reported that reflective learning can be effective on independent and group learning. Haniek [16] in his research adds on the aspect of conscience, and there are some attitudes arising such as tough, diligent, courageous, responsible, honest, independent, discipline, open, and value of life. Meanwhile, the aspects of compassion are the attitude of cooperation, sharing, and caring. Based on the description of learning with RPP approach can elaborate a sense of fun, cooperation, and thoroughness in learning. With the cooperation, students do not have difficulties in understanding the subject matter, so it appears a sense to study more actively to achieve maximum results that is an achievement in learning.

Based on the description, RPP can develop students as a whole person viewed from the attitudes that appear at the time of writing reflection note during the learning process. And, RPP can also improve students understanding with better result compared with contextual learning. Therefore, RPP is an approach that has good quality and can be applied to chemistry learning.

4. Conclusion

Based on supported by empirical evidence from ANOVA presented and referring to the problem statement, for students in grade XI, concluded that students who are taught using RPP approach have better learning achievement than those taught using contextual learning.

5. Implications

Through the RPP approach, the teacher can build a humanitarian value in the learning, RPP can assist the student in improving understanding through every step of the RPP, and also the teacher can know the student's understanding through reflection.

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